IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Michael A. Klug, Mark E. Holzbach, Alejandro Ferdman		
Assignee:	Zebra Imaging, Inc.		
Title:	Method And Apparatus For Recording One-Step, Full-Color, Full-Parallax, Holographic Stereograms		
Serial No.:	10/014,681	Filing Date:	December 11, 2001
Examiner:	Leonidas Boutsikaris	Group Art Unit:	2872
Docket No.:	ZEB0020D2US	Client Ref.:	170

Austin, Texas
August 30, 2006

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 CFR § 41.37

Dear Sir:

This brief is submitted in support of the appeal filed May 25, 2006 by the appellants to the Board of Patent Appeals and Interferences from the Examiner's final rejection of claims 36-41, 57, and 64. The appellants note that the appeal filed May 25, 2006 was received by the USPTO on May 30, 2006, thereby giving the appellants a period for filing set to expire on July 30, 2006. Filed herewith is a Petition for Extension of Time requesting a one-month extension, thereby giving the undersigned a period until August 30, 2006 in which to respond.

Please charge deposit account No. 502306 for the fee of $250.00 associated with this appeal brief. Please charge this deposit account for any additional sums which may be required to be paid as part of this appeal.

REAL PARTY IN INTEREST

The real party in interest on this appeal is Zebra Imaging, Inc.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this application.

STATUS OF CLAIMS

Claims 39-41 and 57 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kihara et al., U.S. Patent No. 5,949,559 (Kihara) in view of Zabka, U.S. Patent No. 5,223,955. Claims 36-38 and 64 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kihara in view of Kasazumi et al., U.S. Patent No. 5,317,435 (Kasazumi) and Benton, U.S. Patent No. 4,834,476. Claims 36-41, 57, and 64 are being appealed.

STATUS OF AMENDMENTS

No amendments were filed subsequent to the final rejection of January 25, 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

The invention is as set forth in the claims. To summarize the invention without intending to limit or otherwise affect the scope of the claims, the invention, as set forth by independent claim 36, relates to an apparatus for printing holographic stereograms. See, for example, page 14, line 20 through page 17, line 19, and **Figure 7**. The apparatus includes a light source that produces a coherent beam, see, for example, **200**, a beam splitter that splits the coherent beam into an object beam and a reference beam, see, for example, **205**, and a material holder holding a holographic recording material having elemental holograms, see, for example, **300**. The apparatus also has an object beam unit, see, for example, **700**, including a removable band-limited diffuser (e.g., **45**), for displaying a rendered image and for conditioning the object beam with the rendered image to interfere with the reference beam at a chosen elemental hologram, wherein the removable band-limited diffuser includes a deterministic phase pattern designed to diffuse light in at least one of a specific pattern and a specific direction, and wherein the removable band-limited diffuser is designed for a wavelength corresponding to a wavelength of the coherent beam. See, for example, page 5, lines 23-27; page 18, line 8 through page 19, line 18; page 29, line 23 through page 30, line 16, **Figure 9** and **Figures 27a-c**. A removable masking plate (e.g., **65**) is located in the path of the reference beam

and proximate to the holographic recording material, wherein the removable band-limited diffuser and the removable masking plate form a matched set configured to allow exposure of a particular size hogel. *Id.* A computer is programmed to control the interference of the object beam and the reference beam and the delivery of the rendered image to the object beam unit. See, for example, **230**.

Independent claim 39, relates to another apparatus for printing holographic stereograms. See, for example, page 14, line 20 through page 17, line 19, and **Figure 7**. The apparatus includes a light source that produces a coherent beam, see, for example, **200**, a beam splitter that splits the coherent beam into an object beam and a reference beam, see, for example, **205**, and a material holder holding a holographic recording material having elemental holograms, see, for example, **300**. The apparatus also has an object beam unit, see, for example, **700**, for displaying a rendered image and for conditioning the object beam with the rendered image to interfere with the reference beam at a chosen elemental hologram. A voxel-control lens (e.g., **500**) is located in the path of the object beam and proximate to the holographic recording material, the voxel control lens being capable of varying the size of at least one voxel and being capable of making the rendered image displayed by the object beam unit as seen from the viewpoint of an elemental hologram appear at a greater apparent distance relative to the holographic recording material. See, for example, page 18, line 8 through page 19, line 18; and **Figures 9** and **10**. A computer is programmed to control the interference of the object beam and the reference beam and the delivery of the rendered image to the object beam unit. See, for example, **230**.

Independent claim 57, relates to a method. See, for example, page 31, line 18 through page 34, line 34 and **Figure 28**. An elemental hologram is selected. *Id.* A coherent light beam is generated and split into an object beam and a reference beam. See, for example, **200** and **205**. An image is rendered (e.g., B and C of **Figure 28**). The object beam is conditioned with the rendered image, the conditioning of the object beam including the step of passing the object beam through a voxel-control lens, the voxel control lens being capable of varying the size of at least one voxel and being capable of making the rendered image as seen from the viewpoint of an elemental hologram appear at a greater apparent distance relative to the holographic recording material. See, for

example, page 18, line 8 through page 19, line 18; and **Figures 9** and **10**. The conditioned object beam is interfered with the reference beam at the selected elemental hologram. *Id.*

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Whether claims 39-41 and 57 are unpatentable under 35 U.S.C. § 103(a) over Kihara in view of Zabka.

II. Whether claims 36-38 and 64 are unpatentable under 35 U.S.C. § 103(a) over Kihara in view of Kasazumi and Benton.

ARGUMENT

I. Claims 39-41 and 57 are patentable over Kihara in view of Zabka

Claims 39-41 and 57 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kihara et al., U.S. Patent No. 5,949,559 (Kihara) in view of Zabka, U.S. Patent No. 5,223,955. The appellants present an argument with respect to independent claim 39, as claims 40 and 41 depend from claim 39, and the relevant limitation in claim 39 is generally the same as that in claim 57.

Kihara and Zabka neither teach nor suggest an apparatus including:

> a voxel-control lens located in the path of the object beam and proximate to the holographic recording material, *the voxel control lens being capable of varying the size of at least one voxel and being capable of making the rendered image displayed by the object beam unit as seen from the viewpoint of an elemental hologram appear at a greater apparent distance relative to the holographic recording material*; and

as required by independent claim 39 and generally required by independent claim 57.

Regarding the claimed voxel-control lens, the Examiner refers to lens 47 of Zabka. Column 6, lines 4-12 state:

> The two cylindrical lenses 43 and 47 enhance image fidelity better than would be the case for a smaller cylindrical lens system, where noise would be greatly magnified. Lenses 43 and 47 also provide more flexibility than the single double convex oil lens previously used at Multiplex. The use of these two lenses also gives easy focus control of converging line focus 51. The placement of these lenses greatly effects depth of field of the resultant hologram.

Thus, while Zabka's lens 47 "effects depth of field" Zabka neither teaches nor suggests a voxel control lens that is both (1) capable of varying the size of at least one voxel, and (2) capable of making the rendered image as seen from the viewpoint of an elemental hologram *appear at a greater apparent distance relative to the holographic recording material.*

In response to similar arguments, the Examiner states:

> [I]t is submitted that one of the results of placing a lens close to the holographic material is to affect the object light incident onto the holographic material and therefore *necessarily* affect the size of the

> recorded hogel . . . . The other result of placing the lens close to the holographic material is to affect the position of the virtual image of the SLM element. (Final Office Action of January 25, 2006, p. 6, top)

The appellants respectfully disagree. First, whether or not the Examiner is correct in asserting that placing a lens close to the holographic material necessarily affects the size of the recorded hogel (and the appellants do not concede this point), the Examiner has not demonstrated that the addition of Zabka's lens 47 allows for *varying the size of at least one voxel*, as claimed. Second, the Examiner has provided no basis for this conclusion, or his other conclusion that placing the lens close to the holographic material will affect the position of the virtual image of the SLM element. Third, the purposes of Kihara's condenser lens 43 (see, e.g., column 5, lines 1-7 and column 6, lines 20-27) and Zabka's lens 47 (see, e.g., column 5, line 65 through column 6, line 3) are the same, to focus the image presented to the recording material. Consequently, one of ordinary skill in the art would not be motivated to incorporate Zabka's lens 47 into Kihara's system because it is not needed. Finally, neither reference teaches or suggests that the lens identified by the Examiner is located proximate to the holographic recording material, as required by appellants claims.

Thus, appellants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. In addition to the claim elements not taught or suggested by the cited references as described above, the Examiner has not shown that there is some suggestion or motivation to combine the references, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Neither reference suggests such a combination. Moreover, the Examiner's stated motivation, i.e., "for achieving easy focus control, flexibility, and enhancement of image fidelity," is simply not achieved through the combination. The Examiner also fails to explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination, as required by, for example, *In re Rouffet,* 47 USPQ2d 1453 (Fed. Cir. 1998).

Accordingly, the appellants respectfully submit that claims 39 and 57 are allowable over Kihara and Zabka. Claims 40 and 41 depend from claim 39 and are allowable for at least this reason.

II. 36-38 and 64 are patentable over Kihara in view of Kasazumi and Benton

Claims 36-38 and 64 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kihara in view of Kasazumi et al., U.S. Patent No. 5,317,435 (Kasazumi) and Benton, U.S. Patent No. 4,834,476. The appellants present an argument with respect to independent claim 36, as claims 37, 38, and 64 depend from claim 36.

Kihara, Kasazumi, and Benton neither teach nor suggest an apparatus for printing holographic stereograms including:

> an object beam unit, including a *removable* band-limited diffuser, for displaying a rendered image and for conditioning the object beam with the rendered image to interfere with the reference beam at a chosen elemental hologram, wherein the removable band-limited diffuser includes a deterministic phase pattern designed to diffuse light in at least one of a specific pattern and a specific direction, and *wherein the removable band-limited diffuser is designed for a wavelength corresponding to a wavelength of the coherent beam;*
>
> a removable masking plate located in the path of the reference beam and proximate to the holographic recording material, *wherein the removable band-limited diffuser and the removable masking plate form a matched set configured to allow exposure of a particular size hogel;* and

as required by independent claim 36.

Regarding the claimed diffuser, the Examiner refers to diffuser 200 of Kasazumi. Nothing in the cited portions of Kasazumi teaches or suggests that diffuser 200 is removable, is band-limited, or is designed for a wavelength corresponding to a wavelength of the coherent beam, all as required by the applicants' claim. The Examiner goes on to state that ". . . the diffuser is band-limited since it is designed to act on laser light of a specific wavelength band." Final Office Action of January 25, 2006, p. 5, ¶1. However, the Examiner has provided no support for this conclusion, and Kasazumi does not teach or suggest that his diffuser "is designed to act on laser light of a specific wavelength ban."

Regarding the claimed removable masking that forms a matched set with the diffuser that is configured to allow exposure of a particular size hogel, the Examiner states that ". . . the diffuser and the masking plate act in concert to allow exposure of a particular hogel." Office Action of January 25, 2006, p. 5, ¶1. First, the Examiner

provides no support for this assertion. Second, even if the Examiner is correct in this assertion (and the appellants do not concede this point), it fails to teach or suggest a *matched set* that is configured to allow exposure of a particular *size* hogel."

Accordingly, the applicants respectfully submit that claim 36 is allowable over Kihara, Kasazumi, and Benton. Claims 37, 38, and 64 depend from claim 36 and are allowable for at least this reason.

CONCLUSION

The appellants respectfully submit that claims 36-41, 57, and 64 are allowable over the cited references for at least the above-stated reasons. The appellants respectfully request that the Board reverse the rejections of these claims.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Appeal Brief - Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA, 22313-1450, on Aug 30, 2006.

Attorney for Appellant(s) — Date of Signature: 8/30/06

Respectfully submitted,

Marc R. Ascolese
Attorney for Appellant
Reg. No. 42,268
512-439-5085
512-439-5099 (fax)

CLAIMS APPENDIX

36. An apparatus for printing holographic stereograms, comprising:
a light source that produces a coherent beam;
a beam splitter that splits the coherent beam into an object beam and a reference beam;
a material holder holding a holographic recording material having elemental holograms;
an object beam unit, including a removable band-limited diffuser, for displaying a rendered image and for conditioning the object beam with the rendered image to interfere with the reference beam at a chosen elemental hologram, wherein the removable band-limited diffuser includes a deterministic phase pattern designed to diffuse light in at least one of a specific pattern and a specific direction, and wherein the removable band-limited diffuser is designed for a wavelength corresponding to a wavelength of the coherent beam;
a removable masking plate located in the path of the reference beam and proximate to the holographic recording material, wherein the removable band-limited diffuser and the removable masking plate form a matched set configured to allow exposure of a particular size hogel; and
a computer programmed to control the interference of the object beam and the reference beam and the delivery of the rendered image to the object beam unit.

37. An apparatus for printing holographic stereograms as in claim 36, the removable masking plate having at least one positioning adjustment device.

38. An apparatus for printing holographic stereograms, as in claim 36, the removable band-limited diffuser having at least one positioning adjustment device.

39. An apparatus for printing holographic stereograms, comprising:
a light source that produces a coherent beam;
a beam splitter that splits the coherent beam into an object beam and a reference beam;
a material holder holding a holographic recording material having elemental holograms;
an object beam unit for displaying a rendered image and for conditioning the object beam with the rendered image to interfere with the reference beam at a chosen elemental hologram;
a voxel-control lens located in the path of the object beam and proximate to the holographic recording material, the voxel control lens being capable of varying the size of at least one voxel and being capable of making the rendered image displayed by the object beam unit as seen from the viewpoint of an elemental hologram appear at a greater apparent distance relative to the holographic recording material; and
a computer programmed to control the interference of the object beam and the reference beam and the delivery of the rendered image to the object beam unit.

40. An apparatus for printing holographic stereograms as in claim 39, wherein:
the object beam unit includes a SLM for displaying the rendered image; and
the voxel-control lens has a focal length about equal to the distance between the voxel-control lens and the SLM.

41. An apparatus for printing holographic stereograms as in claim 39, wherein:
the object beam unit includes a SLM for displaying the rendered image; and
the voxel-control lens has a focal length about equal to the distance between the voxel-control lens and the image of the SLM.

57. A method of printing a holographic stereogram with elemental holograms, comprising the steps of:

selecting an elemental hologram;

generating a coherent light beam;

splitting the beam into an object beam and a reference beam;

rendering an image;

conditioning the object beam with the rendered image, the conditioning of the object beam including the step of passing the object beam through a voxel-control lens, the voxel control lens being capable of varying the size of at least one voxel and being capable of making the rendered image as seen from the viewpoint of an elemental hologram appear at a greater apparent distance relative to the holographic recording material;

interfering the conditioned object beam with the reference beam at the selected elemental hologram.

64. The apparatus of claim 36 wherein each of the removable band-limited diffuser and the removable masking plate are located in respective positions such that the removable band-limited diffuser can be replaced with a second band-limited diffuser and the removable masking plate can be replaced with a second removable masking plate, wherein the second band-limited diffuser and the second removable masking plate allow recording of at least one of a larger elemental hologram, a smaller elemental hologram and a differently shaped elemental hologram.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.